Paper No. 25

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MARCOS KARNEZOS, S.C. CHANG,
EDWARD G. COMBS, and JOHN R. FAHEY

Appeal No. 1997-3152
Application No. 08/116,305

ON BRIEF

Before MARTIN, DIXON, and LEVY, Administrative Patent Judges.

LEVY, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1-19, which are all of the claims pending in this application.

BACKGROUND

The appellants invention relates to a plastic molded package with a heat sink. An understanding of the invention can be derived from a reading of exemplary claim 1, which is reproduced as follows:

1. A plastic molded package, comprising:

a heat sink having an upper surface and a lower surface;

a ceramic ring attached to said lower surface of said heat sink, said ceramic ring having an aperture exposing a portion of said lower surface of said heat sink;

a semiconductor die attached to said exposed portion of said lower surface of said heat sink using a thermally conductive adhesive;

a lead frame having a plurality of leads extending outside of said plastic molded package, said lead frame being attached to said ceramic ring, said lead frame being formed integrally with a downset interposer ring which is attached to said lead frame by a plurality [of] severable tie bars; and

an encapsulation enclosing said ceramic ring, said lead frame other than said portion of said leads outside of said plastic molded package, and said semiconductor die.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

U.S. References

Chu	4,975,761	Dec. 04, 1990
Zimmerman	5,172,213	Dec. 15, 1992

Ohno et al. (Ohno)	5,227,662	Jul. 13, 1993
Nagaraj et al. (Nagaraj)	5,278,446	Jan. 11, 1994
	(filed Jul. 6, 1992)	

Japanese References[1]

Shiozaki	JP 55-026630	Feb. 26, 1980
Nishi et al. (Nishi)	JP 55-162246	Dec. 17, 1980
Ito et al. (Ito)	JP 55-140252	Nov. 01, 1980
Takahashi et al. (Takahashi)	JP 62-076747	Apr. 08, 1987
Nakayama et al. (Nakayama)	JP 04-137756	May 12, 1992
Atobe	JP 04-280661	Oct. 06, 1992

1. Claims 1-2, 8-10, 14, 15, and 18 stand rejected under 35 U.S.C. § 103 as unpatentable over Nakayama considered with Chu and Atobe.

2. Claims 3, 17, and 19 stand rejected under 35 U.S.C. § 103 as unpatentable over Nakayama considered with Chu and Atobe as applied to claims 1, 2, 8-10, 14, 15, and 18, and further in view of Ohno.

3. Claims 4 and 5 stand rejected under 35 U.S.C. § 103 as being unpatentable over Nakayama considered with Chu,

[1] In determining the teachings of all of the Japanese references applied, we will rely on the translations provided by the US PTO. A copy of each translation is attached to this decision for the appellants' convenience.

Atobe, and Ohno as applied to claims 1-3, 8-10, 14, 15, and 17-19, and further in view of Zimmerman.

4. Claim 6 stands rejected under 35 U.S.C. § 103 as being unpatentable over Nakayama considered with Chu, Atobe, and Ohno as applied to claims 1-3, 8-10, 14, 15, and 17-19, and further in view of Nagaraj.

5. Claim 7 is stands rejected under 35 U.S.C. § 103 as being unpatentable over Nakayama considered with Chu, Atobe, and Ohno as applied to claims 1-3, 8-10, 14, 15, and 17-19, and further in view of Nishi or Takahashi.

6. Claims 11-13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Nakayama considered with Chu and Atobe as applied to claims 1, 2, 8-10, 14, 15, and 18 and further in view of Shiozaki.

7. Claim 16 stands rejected under 35 U.S.C. § 103 as being unpatentable over Nakayama considered with Chu and Atobe[2] as applied to claims 1, 2, 8-10, 14, 15, and 18, and further in view of Itou.

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[2] The examiner has erroneously omitted the prior art reference to Atobe in the statement of this rejection. See the statement of the rejection of claim 1, supra, from which claim 16 depends.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellants regarding the above-noted rejections, we make reference to the examiner's answer (Paper No. 22, mailed April 3, 1997), and the final rejection (Paper No. 15, mailed November 14, 1995) for the examiner's complete reasoning in support of the rejections, and to the appellants' brief (Paper No. 21, filed August 5, 1996) for the appellants' arguments thereagainst. Only those arguments actually made by the appellants have been considered in this decision. Arguments which the appellants could have made but chose not to make in the briefs have not been considered. See 37 CFR 1.192(a).

OPINION

In reaching our decision in this appeal, we have carefully considered the subject matter on appeal, the rejections advanced by the examiner, and the evidence of obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, the appellants' arguments set forth in the briefs along with the examiner's

rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the invention as set forth in claims 1-19. Accordingly, we reverse, essentially for the reasons set forth by the appellants in the brief.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having

ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the prima facie case with argument

and/or evidence. Obviousness is then determined on the basis of the evidence as a whole. See id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976).

We consider first the rejection of claims 1, 2, 8-10, 14, 15, and 18 under 35 U.S.C. § 103 based on the teachings of Nakayama considered with Chu and Atobe. Turning first to claim 1, the claim language at issue is as follows:

> said lead frame being formed integrally with a downset interposer ring which is attached to said lead frame by a plurality [of] severable tie bars

The examiner acknowledges (final rejection, page 3) that Nakayama "does not disclose an interposer ring having sections and supported by tie bars." To overcome these deficiencies in Nakayama, the examiner turns to Chu and Atobe. The examiner takes the position (id.) that Chu discloses a one-piece interposer ring 40 downset towards die 10, and conecludes that it would have been obvious to have used an interposer ring in Nakayama to provide electrical contact to the heat sink. Additionally, the examiner states (id.) that Atobe teaches an interposer ring 24 having isolated sections 18 with tie bar supports 16, and that "it would have been obvious . . . to have a severed interposer ring in Nakayama . . . to prevent stress and deformation as taught by Atobe."

The appellants assert (brief, page 10) that Chu's metal layer 40, which the examiner identifies as a downset interposer ring, is not formed integrally with the lead frame 70 (Figure 5). In contrast, metal layer 40 is mounted on printed circuit board 30 and is separated from lead frame 70 by insulating layer 60. We find that Chu discloses (col. 4, lines 18-20) a pc board 30 which Chu refers to as a peripheral pc board. In addition, Chu discloses (col. 4, lines 46-53) that a layer of insulation 60 is provided to insulate lead frame 70 from metal layer or bus 40.

We additionally note that Chu further discloses (col 5, lines 12-31) that

> [w]hen the spacing between the inner end of leads 72 and the terminal pads 12 on die [10] is large, metal traces 40a-40f may be formed on pc board 30, by patterning metal layer 40, for example, as shown in the embodiment of FIG. 6. Metal traces 40a-40f may then act as bridges between leads 72 and terminal pads 12, thereby avoiding the use of long wires between the leads and the die terminal pads. . . .
>
> In any of the embodiments, electrical connection may be made to leads 72 on lead frame 70 through gold wires 76 which are then connected, at their opposite ends either directly to metal bus layer 40, to metal traces portions 40a-40f, to terminal pads 42 on pc board 30, or to terminal pads 12 on die 10.

From these teachings of Chu, we are in agreement with the appellants that Chu's metal layer or bus 40, or patterned as 40a-40f, are spaced from leads 72 by insulation layer 60. However, we also find from these teachings of Chu that metal layer or bus 40, or patterned as 40a-40f constitute an interposer ring that is electrically connected to the lead frame. We find this electrical connection to meet the claim limitation that the interposer ring is formed integrally with the lead frame. However, we find that Chu does not disclose that the interposer ring is attached to the remainder of the lead frame by a plurality of severable tie bars, as required by claim 1. Turning to Atobe, the appellants assert (brief, page 10) that contrary to the examiner's assertion, Atobe's reference numeral 24 does not refer to an interposer ring. According to the appellants, Atobe's reference numeral 24 refers to a void or hole in the structure. From our review of Atobe, we find that reference numeral 24 refers to a "shallow notch." Atobe discloses (translation, page 9) that

> the shallow notches (24) are formed on both sides of the indicating, mechanism (20) of the side of the stage (14) to which the indicating mechanism (20) is connected. The linking mechanism (18) and indicating mechanism (20), therefore, are connected

> via an extremely narrow interface. In order to further reduce the width of the connection interface between the linking mechanism (18) and indicating mechanism (20) and to absorb a deformation attributed to the elongation of the lead during the coining of the inner lead front end, etc., furthermore, similar notches may also be configured on the slit (22) side of said indicating mechanism (20).

and (translation, page 12) that

> notches (24) are formed on the side of the stage (14) to which the indicating mechanism (20) is connected, furthermore, a troubleless severing operation can be performed even if a slight mismatch exists between the mold cutting line for cutting the indicating mechanism (20) and the side of the stage (14).

We find from these teachings of Atobe that the shallow notches 24, are formed on the sides of the indicating mechanism 20 on the side of the stage 14 which is connected to indicating mechanism 18. The shallow notches are formed in the open area on each side of indicating mechanism 20 and project into the area of stage 14. We find this consistent with the disclose of Atobe that similar notches may be configured on the side of slit 22 that faces

indicating mechanism 20. We therefore agree with the appellants

(brief, pages 10 and 11) that reference numeral 24 of Atobe does not refer to an interposer ring. The examiner further asserts (answer, page 4) that reference numeral 20 of Atobe refers to

the interposer ring. We find no teaching in Atobe to establish that the indicating mechanism 20 functions as an interposer ring, and the examiner has not provided any teaching in Atobe to

establish that indicating mechanism 20 of Atobe serves any other purpose other than a link between the linking mechanism 18 and the stage 14 or its support bar 16 (translation, page 7).

The appellants further assert (brief, page 11) that Atobe's interlinking piece 18 protects against elongation and deformation of the inner leads 12, and that there is no disclosure in Atobe of utilizing linking[3] mechanism 18 as an interposer ring. We agree. Atobe discloses (translation, page 10) that

> Sixth process: Linking mechanism removal
> Next, the interface between the front end of

[3] Reference numeral 18 is also referred to as "interlinking."

> the inner lead (12) and the linking mechanism (18) is severed, and the interface between the indicating mechanism (20) and the stage (14) is also severed. After the linking mechanism (18) has been detached, the shape of the front end of the inner lead (12) is optimized.

From these teachings of Atobe, we find that Atobe does not disclose an interposer ring as defined in claim 1.

The appellants further assert (brief, page 12) that "the limitation 'said lead frame being formed integrally with a downset interposer ring which is attached to said lead frame by a plurality [of] severable tie bars' is neither taught by Nakayama nor Chu." With regard to the claimed "severable tie bars," we find (translation, page 2) that the support bars 16 of stage 14 of Atobe constitute tie bars. However, we are in agreement with the appellants (brief, page 12) that

> because Atobe does not have an interposer ring, Atobe provides no teaching or suggestion to form in Nakayama, using Chu's interposer ring, a [sic: an] integrally formed interposer ring with a lead frame, and attaching such an interposer ring to the lead frame by a plurality of severable tie bars in the manner the Examiner asserts it obvious to do.

From all of the above, we conclude that the examiner has failed to establish a prima facie case of obviousness of the

invention of claim 1. Accordingly, the rejection of claim 1 under 35 U.S.C. § 103 is reversed. As independent claim 8 contains language similar to claim 1, the rejection of claim 8 under 35 U.S.C. § 103 is also reversed. As claims 2, 9, 10, 14, 15, and 18 depend from claims 1 or 8, the rejection of claims 2, 9, 10, 14, 15, and 18 under 35 U.S.C. § 103 as unpatentable over Nakayama considered with Chu and Atobe is likewise reversed.

Turning next to the rejection of claims 3, 17, and 19, as independent claim 3 has similar language as claim 1 and the Ohno
reference, additionally relied upon by the examiner does not overcome the deficiencies of Nakayama, Chu and Atobe. Therefore the rejection of claim 3 under 35 U.S.C. § 103, and claims 17 and 19 which depend from claim 3, is therefore reversed.

Turning next to the rejection of claims 4 and 5 under 35 U.S.C. § 103, as these claims depend from claim 3, and the additional reference to Zimmerman does not overcome the deficiencies of Nakayama, Chu, Atobe and Ohno, the rejection

of claims 4 and 5 under 35 U.S.C. § 103 is therefore reversed.

Turning next to the rejection of claim 6 under 35 U.S.C. § 103, as claim 6 depends from claim 3, and the additional reference to Nagaraj does not overcome the deficiencies of Nakayama, Chu, Atobe and Ohno, the rejection of claim 6 under 35 U.S.C. § 103 is therefore reversed.

Turning next to the rejection of claim 7 under 35 U.S.C. § 103, as claim 7 depends from claim 3, and the additional references to Nishi or Takahashi do not overcome the deficiencies of Nakayama, Chu, Atobe and Ohno, the rejection of claim 7 under 35 U.S.C. § 103 is therefore reversed.

Turning next to the rejection of claims 11-13 under 35 U.S.C. § 103, as claims 11-13 depend from claim 8, and the additional reference to Shiozaki does not overcome the deficiencies of Nakayama, Chu, and Atobe, the rejection of claims 11-13 under 35 U.S.C. § 103 is therefore reversed.

Turning next to the rejection of claim 16 under 35 U.S.C. § 103, as claim 16 depends from claim 1, and the additional reference to Itou does not overcome the deficiencies of

Nakayama, Chu, and Atobe, the rejection of claim 16 under 35 U.S.C. § 103 is therefore reversed.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1-19 under 35 U.S.C. § 103 is reversed.

REVERSED

JOHN C. MARTIN Administrative Patent Judge	)
JOSEPH L. DIXON Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
STUART S. LEVY Administrative Patent Judge	)

ssl/vsh

EDWARD C. KWOK
SKJERVEN, MORRILL, MACPHERSON,
FRANKLIN & FRIEL
25 METRO DRIVE, SUITE 700
SAN JOSE, CA 95110